

402<sup>ND</sup> BATTALION IRAQI ARMY  
HEADQUARTERS BARRACKS  
AL HILLAH, IRAQ

**SIGIR PA-06-077**  
**JANUARY 29, 2007**

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## **SPECIAL INSPECTOR GENERAL FOR IRAQ RECONSTRUCTION**

January 29, 2007

MEMORANDUM FOR DIRECTOR, IRAQ RECONSTRUCTION MANAGEMENT OFFICE  
COMMANDING GENERAL, MULTI-NATIONAL SECURITY  
TRANSITION COMMAND - IRAQ  
COMMANDING GENERAL, GULF REGION DIVISION, U.S.  
ARMY CORPS OF ENGINEERS

SUBJECT: Report on Project Assessment of the 402nd Battalion Iraqi Army Headquarters  
Barracks, Al Hillah, Iraq (Report Number SIGIR-PA-06-077)

We are providing this project assessment report for your information and use. We assessed the design and construction work being performed at the 402nd Battalion Iraqi Army Headquarters Barracks, Al Hillah, Iraq to determine its status and whether objectives intended will be achieved. This assessment was made to provide you and other interested parties with real-time information on a relief and reconstruction project underway and in order to enable appropriate action to be taken, if warranted. The assessment team included an engineer/inspector and an auditor/inspector.

This report does not contain any negative findings. As a result, no recommendations for corrective action were made and further management comments are not requested.

We appreciate the courtesies extended to our staff. If you have any questions please contact Mr. Brian Flynn at [brian.flynn@sigir.mil](mailto:brian.flynn@sigir.mil) or at 914-360-0607. For public or congressional queries concerning this report, please contact SIGIR Congressional and Public Affairs at [publicaffairs@sigir.mil](mailto:publicaffairs@sigir.mil) or at (703) 428-1100.

Stuart W. Bowen, Jr.  
Inspector General

# Special Inspector General for Iraq Reconstruction

SIGIR PA-06-077

January 29, 2007

## 402<sup>nd</sup> Battalion Iraqi Army Headquarters Barracks Al Hillah, Iraq

### Synopsis

**Introduction.** This project assessment was initiated as part of our continuing assessments of selected sector reconstruction activities for Facilities and Transportation. The overall objectives were to determine whether selected sector reconstruction contractors were complying with the terms of their contracts or task orders, and to evaluate the effectiveness of the monitoring and controls exercised by administrative quality assurance and contract officers. We conducted this project assessment in accordance with the Quality Standards for Inspections issued by the President's Council on Integrity and Efficiency. The assessment team included an engineer/inspector and an auditor/inspector.

Contract W916QW-05-D-0014, an indefinite delivery/indefinite quantity contract, was awarded on 1 December 2004. Task Order 0005 under the contract was issued on 12 October 2005 in the amount of \$736,939.49 for the construction of new facilities and renovation of existing facilities for the First Battalion, Second Brigade, Eighth Division (1/2/8) Iraqi Army Barracks<sup>1</sup>, in Al Hillah, Iraq. At the time of our assessment, the project was reported to be 70% complete.

**Project Assessment Objectives.** The objective of this project assessment was to provide real-time relief and reconstruction project information to interested parties in order to enable appropriate action, when warranted. Specifically, we determined whether:

1. Project components were adequately designed prior to construction or installation;
2. Construction or rehabilitation met the standards of the design;
3. The contractor's Quality Control plan and the U.S. Government's Quality Assurance program were adequate;
4. Project sustainability was addressed ; and
5. Project results were consistent with original objectives.

**Conclusions.** The assessment determined that:

1. The U.S. Army Corps of Engineers design package was adequate to construct the buildings and facilities included in the contract Statement of Work. The U.S. Army Corps of Engineers developed a design package that consisted of architectural, mechanical, electrical, civil, and structural drawings coupled with the Statement of Work, which provided the contractor with the necessary requirements to construct the project. The contract Statement of Work also provided a bill of quantities listing construction material requirements for the contractor to follow. However, there were some omissions associated with the design. The design drawings did not include details showing typical wall construction, lintel construction, masonry wall tie and connection details, and

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<sup>1</sup> After we announced the inspection of the 402<sup>nd</sup> Battalion Iraqi Army Headquarters Barracks project, the U.S. Army Corps of Engineers informed us that the project name had changed to the First Battalion, Second Brigade, Eighth Division Iraqi Army Barracks. For the remainder of this inspection report, we will refer to the project by its new name.

window and door frame installation. Also, some of the architectural drawings were dimensionless and none of the drawings contained a scale. The drawings for the 300 cubic meter water storage tank lacked details on sizing of steel components and welded connections.

2. In general, the construction appeared to meet the standards of the Statement of Work and design. The inspection team did not observe significant deficiencies during its visit to the project site. However, the noticeable crack in the classroom building exterior requires further assessment by the Gulf Region South Babil Resident Office and remedial action taken to correct the problem. In addition, since the water tank design lacked sufficient detail, the water tank construction should also be assessed for structural adequacy. The U.S. Army Corps of Engineers Gulf Region South Babil Resident Office provided adequate oversight to ensure the requirements of the Statement of Work and the design were met.
3. The contractor's Quality Control plan was sufficiently detailed to effectively guide the contractor's Quality Management program. Further, the contractor's daily quality control reports contained required project and work activity information to document construction progress and identify problems and required corrective action.

The Government Quality Assurance program was effective in monitoring the contractor's Quality Control program. The U.S. Army Corps of Engineers Gulf Region South Babil Resident Office Project Engineer and Quality Assurance Representative ensured that all deficiencies cited during quality assurance inspections were corrected. The Quality Assurance Representative also completed daily quality assurance reports that contained project specific information to document construction progress and highlight deficiencies.

4. Sustainability was not adequately addressed in the basic contract and was not mentioned in the task order requirements. The basic contract did not address spare parts lists, major catalog cuts, and certifying warranties in the name of the appropriate Ministry, for all equipment, including any mechanical, electrical and/or electronic devices. Instead, the basic contract made vague references to Operations and Maintenance manuals and training, warranty information, and as-built drawings. In addition, this report identified low quality plumbing fixtures and barracks buildings' doors used by the contractor. The use of these items will present the Iraqi Army with continual maintenance problems.
5. The observed 402<sup>nd</sup> Battalion Iraqi Army Headquarters Barracks construction project results were consistent with the original task order objectives. The report does document concerns requiring Gulf Region South follow-up and possible remedial action. Overall, the project has resulted in the construction of new buildings and facilities required in the Statement of Work. The completed project will result in additional facilities for Iraqi Army soldiers to live and work.

**Recommendations and Management Comments.** This report does not contain any negative findings or recommendations for corrective action. Although management comments were not required, the Commanding General, Gulf Region Division of the U.S. Army Corps of Engineers, provided comments concurring with the draft report.

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# Introduction

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## Objective of the Project Assessment

The objective of this project assessment was to provide real-time relief and reconstruction project information to interested parties in order to enable appropriate action, when warranted. Specifically, we determined whether:

1. Project components were adequately designed prior to construction or installation;
2. Construction or rehabilitation met the standards of the design;
3. The contractor's Quality Control plan and the U.S. Government's Quality Assurance (QA) program were adequate;
4. Project sustainability was addressed; and
5. Project results were consistent with original objectives.

## Pre-Site Assessment Background

### Contract, Task Order, and Costs

The 402<sup>nd</sup> Battalion Iraqi Army Headquarters Barracks Project is funded through the U.S. Government's appropriated Iraq Relief and Reconstruction Fund (IRRF) and administered by the U.S. Army Corps of Engineers, Gulf Region South (USACE-GRS) Forat Area Office, Babil Resident Office for the Multinational Security Transition Command-Iraq (MNSTC-I). Contract W916QW-05-D-0014, an indefinite delivery/indefinite quantity (IDIQ) contract, was awarded on 1 December 2004. There are currently four modifications to the original contract.

- Modification #01, dated 18 March 2005, transferred authority to the USACE GRS.
- Modification #02, dated 23 September 2005, exercised Option 1 in the maximum amount of \$50,000,000.
- Modification #03, dated 6 October 2005, corrected the minimum guaranteed amounts included in Modification P00002 for the base and Option years 1-3.
- Modification #04, dated 24 October 2005, corrected the dates included in Modification P00003 for the base and Option years 1-3.

Task Order 0005 was issued on 12 October 2005 in the amount of \$736,939.49 for the construction of new facilities and renovation of existing facilities for the First Battalion, Second Brigade, Eighth Division (1/2/8) Iraqi Army Barracks<sup>2</sup>, in Al Hillah, Iraq. The work under this TO is identified as Project Number 23026, listed in the Project and Contracting Office (PCO) construction database, dated 14 July 2006. At the time of our assessment, the project was reported to be 70% complete.

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<sup>2</sup> After we announced the inspection of the 402<sup>nd</sup> Battalion Iraqi Army Headquarters Barracks project, the U.S. Army Corps of Engineers informed us that the project name had changed to the First Battalion, Second Brigade, Eighth Division Iraqi Army Barracks. For the remainder of this inspection report, we will refer to the project by its new name.

There was one modification to the initial TO:

- Modification #01, issued 4 November 2005, administratively changed the original project name to conform to the new 8<sup>th</sup> Division, Iraqi Army numbering. The new name of the project is “1/2/8 Battalion, Iraqi Army.”

### **Project Objective**

The objective of this project was to construct new facilities and renovate existing facilities for the 1/2/8 (formerly 402nd) Battalion Garrison, Iraqi Army, located in the city of Al Hillah, Babil Governorate, Iraq.

### **Description of the Facility (pre-construction)**

The description of the facility (pre-construction) was based on information obtained from the USACE project file, and discussions with the USACE GRS Babil Resident Office Project Engineer (PE). The project site was located on the 1/2/8 Battalion's existing compound, located in the city of Al Hillah along the Hillah-Najaf Highway in the Babil Governorate. The compound served as a functional garrison for the Iraqi Army. Local utilities, electric and water, were available to the compound.

### **Scope of Work of the Contract**

Based on the Task Order Statement of Work (SOW), the project included construction of the following buildings and facilities:

- Two 75-man barracks
- Two ablution buildings with 8 water closets, 7 showers, and 8 hand washing stations
- Medical clinic addition
- Classroom building
- Armory
- A 300 cubic meter (m<sup>3</sup>) water storage tank
- Asphalt concrete roads and pads
- Covered parking (i.e., sunshades) for 48 vehicles

### **Current Project Design and Specifications**

Since the task order was for construction services, the SOW did not require project design submittals and approvals. The contract drawings and specifications were included with the contract SOW provided to the contractor.

The design included drawings for every facility within the SOW. The design package consisted of architectural, civil, electrical, mechanical, and structural drawings for the 1/2/8 Battalion buildings and facilities. The architectural drawings contained floor plans, elevations, typical sections, and window and door requirements. They did not include details showing typical wall construction, lintel construction, and window and door frame installation. Also, some of the architectural drawings were dimensionless and none of the drawings contained a scale.

Structural drawings included plan and cross sectional views of structural members (footers, columns, beams, and floor and roof slabs). The structural drawings also included the foundation plan and conceptual layout of the 300 m<sup>3</sup> water storage tank. The structural drawings did not show details of how the walls of the tank were tied together or connections made to structural concrete beams or columns using dowels



or wall ties. The drawings for the water storage tank lacked details on sizing of steel components and welded connections.

Mechanical drawings included plumbing plans and details for water and sanitary sewer systems, as well as plans and details for central and individual room heating, ventilation, and air conditioning (HVAC) systems. Electrical drawings contained electrical plans, lighting plans, and electrical panel schedules. The civil drawings provided location, sizes, and pipe elevation details for the sanitary system, as well as drawings showing septic tank design.

In addition to the design drawings, the USACE specifications in Construction Specifications Institute (CSI) format described the quality requirements for the workmanship, including the required standards expected to be achieved. The SOW lists 42 specification sections that were applicable to the project. The USACE provided the assessment team with 28 specification sections to review. The missing sections included those listed in the SOW for Division 8 (windows and doors), Division 9 (interior finishes) and Division 10 (toilet accessories).

In addition to the requirements contained in the specifications, the SOW required all works for the garrisons to be “carried out to National Iraqi Standards or equivalent British/American Standards where/as applicable.”

The SOW and bill of quantities (BOQ) also augmented the design by providing the contractor construction requirements pertaining to material quantities and sizing information. For example, the design drawings did not provide floor slab thicknesses for any of the buildings. However, the SOW provided the thickness for the barracks, ablution buildings, and medical clinic, but not for the classroom and the armory buildings.

The SOW required the GRS site engineer approval of all plumbing equipment and accessories prior to procurement. The USACE PE stated that a formal submittal and review process was not used for this project.

In summary, based on our review of the SOW, BOQ, and drawings and specifications, and despite the lack of detail in the drawings noted above, the design package appeared adequate to construct the buildings and facilities for the 1/2/8 Iraqi Army Battalion.

## **Site Assessment**

On 25 August 2006, we performed an on-site assessment of the 1/2/8 Battalion project. According to the USACE GRS Babil Resident Office, the project was 70% complete at the time of our assessment, with a scheduled completion date of 30 September 2006.

The on-site assessment included inspections of all of the buildings and facilities listed in the task order SOW. Substantially completed buildings (except for punch list items) included the following:

- Classroom building
- Barracks (2)
- Ablution buildings (2)
- Medical clinic
- Armory

These buildings were substantially complete and final inspections by the USACE Resident Office were pending. The covered vehicle parking (sunshades) were also complete, and partially occupied with Iraqi Army vehicles.

During the site assessment, we were accompanied by the USACE GRS Deputy District Commander, the USACE Babil Resident Engineer (RE) and PE.

### **Work Completed**

The 1/2/8 Battalion buildings for this project were designed using the same architectural style, which included masonry and reinforced concrete structures. The exteriors of the buildings consisted of a painted and textured cement plaster finish.

The foundation design for the barracks consisted of a series of pad footings supporting reinforced concrete interior and exterior columns and perimeter wall footings supporting exterior walls. Because of the open floor plan in the two barracks buildings, interior and exterior reinforced concrete columns and beams provided the structural frame for the building to support the roof slab and parapet. The SOW required a 10 centimeter (cm) reinforced concrete floor slab and an 18 cm reinforced concrete roof slab.

Based on the design, the other buildings' foundations included a series of wall footings supporting the interior and exterior masonry walls. Based on the SOW, the ablution buildings and medical clinic required a 10 cm reinforced concrete floor slab and an 18 cm reinforced concrete roof slab. The floor slab and roof slab required thicknesses for the Armory and the Classroom were not provided in the SOW or drawings. The design also called for 200 millimeter (mm) deep reinforced concrete bond beams on all free standing walls that supported the reinforced concrete roof slab and parapet.

The following summarizes for each of the completed buildings and facilities we inspected the pertinent design requirements and what we actually observed on site.

### **Barracks**

Each one-story barracks buildings contained a 20 by 12 meter (m) room to house 75 soldiers. The barracks also contained an issue room and an arms room, each approximately 4 x 3 m in size. The SOW required plastered and painted interior walls, ceilings, and mosaic tile floors. The mechanical design called for ten, two-ton split system HVAC units and the electrical design required ceiling fans for added air circulation. The SOW also required "good quality" aluminum windows and doors. We did not find any noticeable deficiencies associated with the interior of the two barracks.

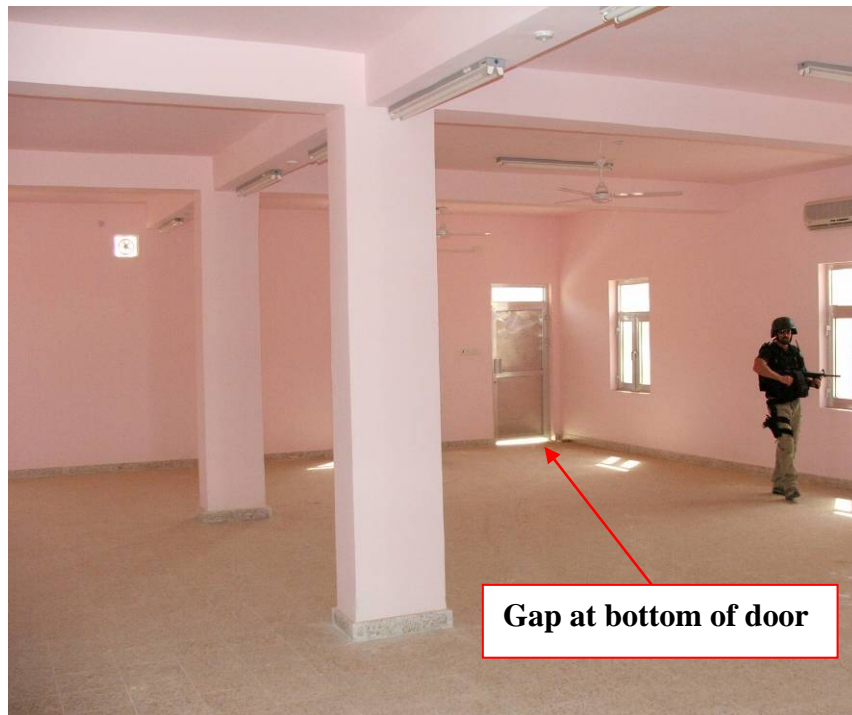
Although the interior appeared satisfactory, the two entry/exit aluminum doors in the barracks sleeping quarters did not appear to be "good quality," especially for the high traffic expected with a 75-man barracks. Site Photos 1 and 2 provide closer views of one of the aluminum doors and associated hardware. In addition, the doors did not have sweeps. Noticeable gaps were present between the thresholds and bottom of the doors as seen in the door shown in Site Photo 3.



**Site Photo 1. Barracks entrance door cross section**



**Site Photo 2. Barracks entrance door**



**Gap at bottom of door**

**Site Photo 3. Interior of one of the two barracks**

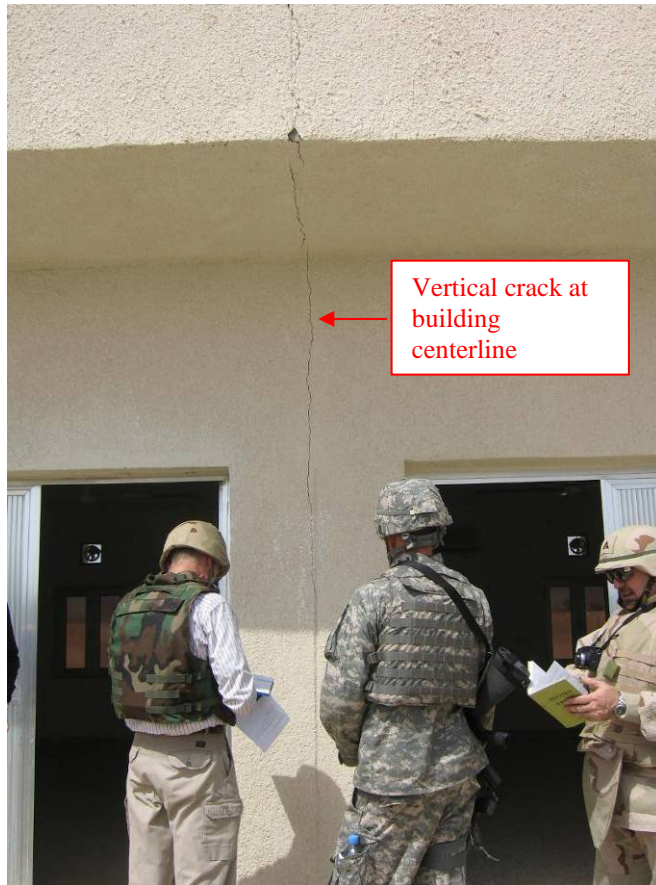
### Classroom Building

The architectural floor plan showed a rectangular building containing four equal sized classrooms, each approximately 4.25 x 8.35 m with an exterior entrance door for each classroom. The interior finishes were the same as the barracks buildings, but the design drawings did not include any information about the interior finishes. We observed plastered and painted walls and ceilings, with mosaic floor tile in the interior and a plastered and textured finish on the exterior. Each room contained aluminum frame windows and an aluminum entrance door. Site Photo 4 shows the exterior of the classroom building.

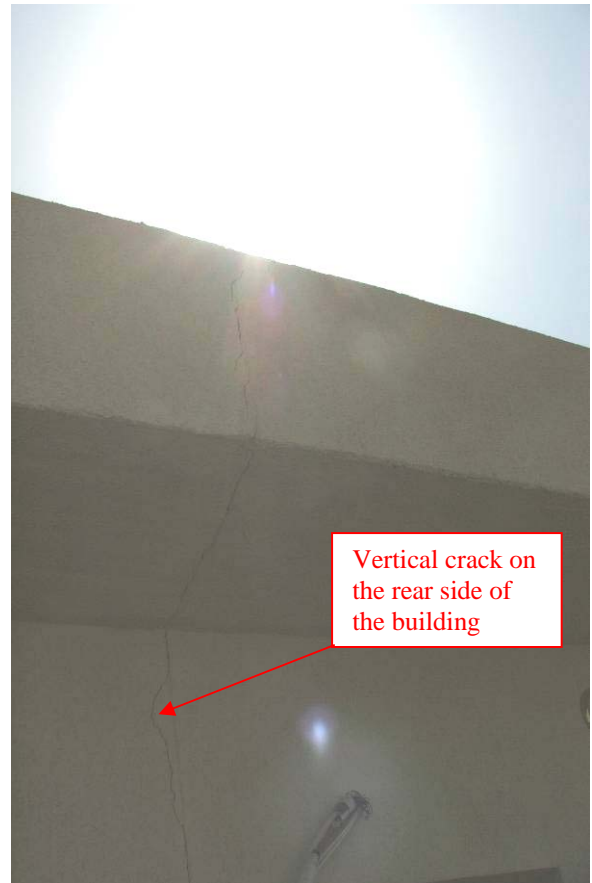


**Site Photo 4. Classroom building with four classrooms**

The design included two, two-ton HVAC units in each classroom augmented with a ceiling fan, and two wall exhaust fans, which we verified as installed. Overall, the building appeared satisfactory, except we did observe a noticeable crack in the exterior near the center of the building. The crack ran on both sides of the building, beginning at the sidewalk and continuing vertically in the wall and along the soffit and parapet as shown in Site Photos 5 and 6. The structural design for the building shows in the center of the building, a 480 mm masonry wall consisting of two, side by side masonry wall sections, each 240 mm thick. The design also shows the dual masonry walls supporting two adjoining bond beams, each 250mm thick. The design does not show any tying mechanism between the dual masonry walls or connecting reinforcing steel or dowels in the two concrete beams. Based on this design and the presence of the vertical crack along the building centerline, it appears there should be an expansion joint in the center of the building to allow for the differential movement of each side of the building.



**Site Photo 5. Vertical crack in front side of classroom building exterior**



**Site Photo 6. Vertical crack in opposite side of classroom building exterior**

### Medical Clinic

The medical clinic was designed as an addition to an existing medical clinic with a covered breezeway to connect the addition to the existing clinic. The building we inspected was a stand-alone facility without a connecting breezeway; however, in accordance with the design, it did contain an entrance area and three rooms: a patient ward, a storeroom, and a laboratory. Site Photo 7 shows the front side of the medical clinic, including the main entrance.



**Site Photo 7. Exterior of the medical clinic**

The SOW required a plastered and painted finish for the ceilings inside the medical clinic and ceramic tile walls and floors for the ward area and the laboratory. We found ceramic wall and floor tile in the laboratory, but the patient ward room contained plastered and painted walls and ceilings, and mosaic floor tile. We found no deficiencies with the quality of workmanship in either room. The other required interior finishes included fluorescent lighting, metal windows, wooden interior doors, and metal exterior doors, which we observed in our inspection. Although they appeared to be installed correctly, we did observe a noticeable gap at one exterior door location between the threshold and the bottom of the door as shown in Site Photo 8.



**Site Photo 8. Medical clinic exterior door**



The design also required two-ton, split system HVAC units to be installed in the patient ward, the storeroom, and the laboratory, augmented with ceiling fans and wall mounted exhaust fans. We verified the installation of the HVAC units and fans during our inspection.

The plumbing design drawings showed a double sink in the laboratory and a single sink and a wash basin in the patient ward area. We found one pedestal style wash basin in the laboratory and one in the patient area. A single sink, shown in Site Photo 9, was installed in the laboratory. The USACE PE told us this sink was substandard and would be replaced prior to final acceptance of the building.



**Site Photo 9. Medical clinic exterior sink**

### Ablution Buildings

The project scope included construction of two single story ablution buildings, each one near one of the new barracks. The design for each 8 x 10 m building included seven individual showers, eight water closets, and a hand washing station with eight faucets, and three electric water heaters, which we verified during our inspection. The SOW required a sand-cement exterior wall finish. The SOW also required the contractor to plaster to a smooth finish and paint interior walls and ceilings, and to install mosaic floor tile. During our inspection, we observed plastered and painted ceilings, and mosaic floor tiles. The contractor had also installed ceramic tile to a height of about six feet along the walls as shown in Site Photo 10. We did not find any noticeable deficiencies associated with the ablution building interior and exterior construction. However, we did observe what appeared to be low quality plumbing fixtures (shower heads, water supply lines, faucets, drain covers, etc.) installed in the showers, wash stations, and water closets. Site Photo 11 shows the type of plumbing materials used in the water closets, which includes flexible water hoses, plastic supply tanks, and plastic tubing from the tank to the toilet.

Considering the heavy usage the ablution buildings will receive, this type of low quality material will pose continual maintenance problems for the Iraqi Army.



**Site Photo 10. Ceramic tile finish on shower walls in ablution buildings**



**Site Photo 11. Water closet in ablution building**



## Armory

The SOW required the construction of a 20 x 6.3 m single story armory with a weapons issue office and four weapons storage areas. The design required interior and exterior walls, ceilings to be plastered and painted, and all floors to have a smooth troweled concrete finish. The design also called for steel internal and external doors and aluminum windows with metal grilles for security. The mechanical design for each room in the armory included two, two-ton HVAC units and ceiling fans in the weapons issue office and two exhaust fans in each weapons storage room.

We found the armory constructed as designed with no significant deficiencies. We also observed the contractor had installed mosaic tile in every room over the concrete floor slab. Site Photo 12 shows the front of the armory building including, the steel entrance door, windows with metal grilles, and one of the two-ton HVAC units.



**Site Photo 12. Exterior view of armory entrance**

## Covered Parking (sunshades)

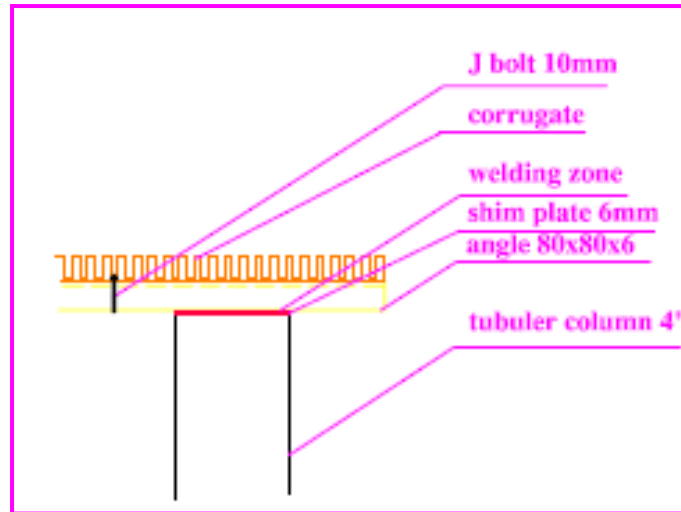
The SOW requirements for two covered parking structures (sunshades) for 40 vehicles and 8 vehicles respectively required the following:

*“Concrete in bases for each of the 4” tubular steel columns using a (1:2:4) mixture. Field weld connections between tubular columns, top plates, and L80x80x4 angles. Attached corrugated sheets to angles with J-hooks, spaced no more than 80 cm apart. Paint all exposed steel surfaces with one coat zinc-rich primer and two coats enamel paint.”*

The assessment team inspected both parking sunshades and found no significant deficiencies based on the SOW requirements and the design. We did note that many of the four inch tubular columns consisted of spliced sections of pipe welded together to form one tubular column. The design did not provide any details as to whether welded pipe columns were allowed.

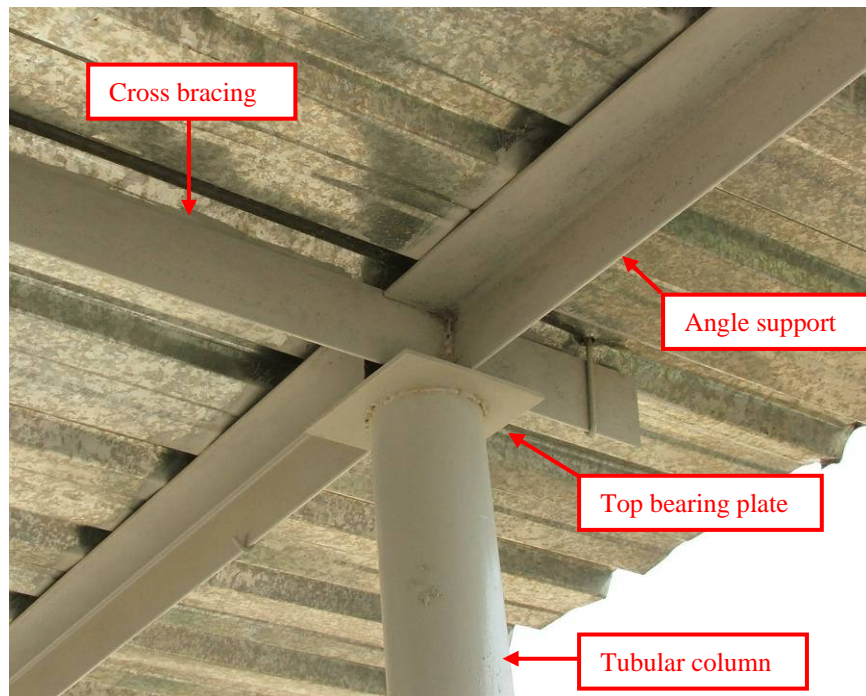
The design detail for the structural frame supporting the corrugated roof sheeting (Figure 1) showed an 80 x 80 x 6 angle supporting the roof sheeting. No units were provided for

the angle, although it is assumed the dimensions are in millimeters. Figure 1 also shows the angle welded to a shim plate at the top of the column. There were no details provided on the type or size of weld or the type and thickness of the corrugated roof sheeting. The design also did not show any lateral cross bracing perpendicular to the angle support shown in Figure 1.



**Figure 1. Design detail for covered parking (sunshade)**

Site Photo 13 shows the actual welded angle connections at the bearing plate (i.e., shim plate) at the top of each tubular column. Also shown is the lateral cross bracing. The roof sheeting material appeared to be a thin gage sheet metal, connected to the frame with J-bolts as depicted in Figure 1.



**Site Photo 13. Typical column support for covered parking (sunshade)**

## **Work in Progress**

### **Water Storage Tank**

The SOW required a 300 m<sup>3</sup> (10 x 10 x 3 m) water storage tank supported on a concrete foundation and a structural steel frame. However, the four design drawings lacked sufficient details, and provided only a conceptual layout of the tank structural frame. There were no details on the sizes of the structural support members, or the thicknesses of the tank's bottom, sidewalls, and cover. Further, there were no connection details showing how the tank's bottom, sidewalls, and cover are interconnected, nor were there any details showing the connections between the vertical structural supports and the tank walls.

During our assessment, we observed a partially completed water tank as shown in Site Photo 14 that met the size requirements for a 300 m<sup>3</sup> tank. The tank was supported by a concrete foundation and structural steel frame. The tank sides consisted of steel plate, spot-welded to the structural steel supports. Site Photo 15 shows the spot welding along one side of the tank. The steel plates appeared to be approximately 0.25 inches thick.



**Site Photo 14. 300 m<sup>3</sup> water storage tank under construction**





**Site Photo 15. One of the tank's sidewalls showing steel plates spot welded to frame**

Given the lack of details in the design, the assessment team could not determine whether the water tank construction met the standards of the design. However, we were concerned with the quality of the spot welds and if there was sufficient steel plate thickness to withstand the hydrostatic pressures associated with a fully filled 300 m<sup>3</sup> water tank. We discussed our concerns with the USACE Babil RE and PE. We also recommended the USACE GRS structural engineer assess the adequacy of the water tank construction.

### Roads

The SOW required the contractor to: *“Provide for 10 centimeters (cm) of bituminous base course over 30 cm aggregate base course for roads and pads and shown in drawings.”*

The site plan showed a conceptual layout of the new road and pad locations, although there were no road drawings showing a typical detail of the roadway cross section. However, the SOW listed a requirement to provide 2,540 m<sup>2</sup> of roads/pads consisting of 10 centimeters (cm) of bituminous asphalt pavement over a 30 cm compacted subbase. At the time of our assessment, the contractor's road construction was in progress. We

observed compacted subbase material in place at various locations on the compound. Site Photo 16 shows one of those locations in front of the medical clinic. The USACE PE indicated the contractor would construct the required amount of paved surfaces specified in the SOW (i.e., 2,540 m<sup>2</sup>).

The surface of the subbase appeared to consist of compacted granular material. Although we could not measure the depth of the subbase, the sections of new roadway we observed appeared adequate.



**Site Photo 16. Compacted subbase material for one of the new roads under construction**

### **Work Pending**

Pending work included completion of the water storage tank construction, connecting the tank to the distribution system, and hydrostatic testing of the tank and waterlines. In addition, the new roads need to be finished by constructing a 10 cm asphalt base course as the pavement wearing surface.

## **Project Quality Management**

### **Contractor's Quality Control Program**

The basic contract required a Quality Control (QC) program, consisting of a contractor QC plan, daily QC reports, deficiency tracking, list of QC testing, and any transferred or installed property.

The contractor submitted a QC plan to the USACE. The plan addresses the QC organization, inspections, and work plans for earthwork, concrete, masonry, metal, wood and plastics, doors and windows, mechanical and electrical work. The QC plan consisted of plans and procedures necessary to produce an end product that complies with contractual requirements. However, the QC plan did not contain organization charts, the qualifications of QC personnel, and deficiency logs.

The contractor submitted QC reports on a daily basis, which were reviewed by the USACE GRS Babil Resident Office Quality Assurance Representative (QAR) and PE. These reports contained information such as work accomplished each day at the location, test results, deficiencies and corrective actions, labor distribution, and

overall project completion percentage. The contractor also maintained deficiency logs to document problems noted with construction/renovation activities.

### **Government Quality Assurance Program**

The USACE GRS Babil Resident Office QAR maintained daily QA reports that documented any deficiencies noted at the site. Based on our review, we found the QAR's reports to be sufficiently complete, accurate, and timely. In addition to containing project specific information to document construction progress and highlight deficiencies, the QAR also supplemented them with detailed photographs that reinforced the narrative information provided in the reports. The USACE GRS Babil Resident Office QAR did not maintain a QA deficiency log; however, the USACE GRS Babil Resident Office PE and the QAR did ensure that all deficiencies cited during QA inspections were corrected.

The QAR was on site every day in managing this project and the PE made frequent visits to the site to verify the contractor's construction and progress. They spent a significant amount of their time at project sites interacting with the contractor and observing construction activities. Further, they ensured that potential construction deficiencies were detected, evaluated, and properly corrected, in a timely manner.

The Government QA program was effective in monitoring the contractor's QC program for the 1/2/8 Iraqi Army Barracks construction and renovation project. In addition, QA activities were sufficiently and accurately documented. This condition occurred because of the efforts of the PE and QAR during the course of the project.

## **Project Sustainability**

The basic contract required the contractor to provide Operations and Maintenance (O&M) documentation and manuals, O&M training, warranty information, and as-built drawings.

The basic contract did not address spare parts lists, major catalog cuts, and certifying warranties in the name of the appropriate Ministry, for all equipment, including any mechanical, electrical, and/or electronic devices. TO 5 did not address the issue of warranties of workmanship and equipment, catalog cuts, spare parts, or manuals.

Earlier in this report, we identified potential sustainability issues with the low quality plumbing fixtures in the ablution buildings. For example, the plumbing materials used in the water closets included flexible water hoses, plastic supply tanks, and plastic tubing from the tank to the toilet; while in the showers, the water faucets are susceptible to breaking off and the thin metal tubing to the shower head is connected to the wall with a one screw clamp (Site Photos 17 and 18). Over time, the clamp will dislodge from the wall and the shower water pipe will remain unsupported. Considering the heavy usage the ablution buildings will receive, the low quality material will pose continual maintenance problems for the Iraqi Army.



**Site Photo 17. Shower fixture in the ablution building**



**Site Photo 18. Close up view of clamp**

In addition, we also identified the poor quality aluminum doors in the barracks sleeping quarters. As with the ablution buildings, considering the heavy traffic expected in a 75-man barracks, a higher quality type door was needed. Another concern is that during a strong windstorm, the aluminum doors may fly off.

USACE GRS Babil Resident Office and MNSTC-I staff agreed the plumbing fixtures and aluminum doors used were of poor quality and presented future maintenance problems for the Iraqi Army; however, both stated these are items readily available within Iraq, which should help with quick replacement.

## **Conclusions**

Based upon the results of our site visit, we reached the following conclusions for assessment objectives 1, 2, 3, 4, and 5. Appendix A provides details pertaining to Scope and Methodology.

1. Determine whether project components were adequately designed prior to construction or installation.

The U.S. Army Corps of Engineers developed design was adequate to construct the buildings and facilities included in the contract Statement of Work. The U.S. Army Corps of Engineers developed a design package that consisted of architectural, mechanical, electrical, civil, and structural drawings coupled with the Statement of Work, which provided the contractor with the necessary requirements to construct the

project. The contract Statement of Work also provided a bill of quantities listing construction material requirements for the contractor to follow. However, there were some omissions associated with the design. The design drawings did not include details showing typical wall construction, lintel construction, masonry wall tie and connection details, and window and door frame installation. Also, some of the architectural drawings were dimensionless and none of the drawings contained a scale. The drawings for the 300 m<sup>3</sup> water storage tank lacked details on sizing of steel components and welded connections.

2. Determine whether construction met the standards of the design.

In general, the construction appeared to meet the standards of the Statement of Work and design. The inspection team did not observe significant deficiencies during its visit to the project site. However, the noticeable crack in the classroom building exterior requires further assessment by the U.S. Army Corps of Engineers Gulf Region South Babil Resident Office and remedial action taken to correct the problem. In addition, since the water tank design lacked sufficient detail, the water tank construction should also be assessed for structural adequacy. The U.S. Army Corps of Engineers Gulf Region South Babil Resident Office provided adequate oversight to ensure the requirements of the Statement of Work and the design were met.

3. Determine whether the contractor's Quality Control plan and the Government Quality Assurance program were adequate.

The contractor's Quality Control plan was sufficiently detailed to effectively guide the contractor's Quality Management program. Further, the contractor's daily Quality Control reports contained required project and work activity information to document construction progress and identify problems and required corrective action.

The Government Quality Assurance program was effective in monitoring the contractor's Quality Control program. The U.S. Army Corps of Engineers Gulf Region South Babil Resident Office Project Engineer and the Quality Assurance Representative ensured that all deficiencies cited during quality assurance inspections were corrected. The Quality Assurance Representative also completed daily quality assurance reports that contained project specific information to document construction progress and highlight deficiencies.

4. Determine if project sustainability was addressed.

Sustainability was not adequately addressed in the basic contract and not mentioned in the task order requirements. The basic contract did not address spare parts lists, major catalog cuts, and certifying warranties in the name of the appropriate Ministry, for all equipment, including any mechanical, electrical, and/or electronic devices. Instead, the basic contract made vague references to Operations and Maintenance manuals and training, warranty information, and as-built drawings. In addition, this report identified low quality plumbing fixtures and barracks buildings' doors used by the contractor. The use of these items will present the Iraqi Army with continual maintenance problems.

5. Determine whether project results were consistent with original objectives.

The observed 1/2/8 Battalion Iraqi Army Headquarters Barracks construction project results were consistent with the original task order objectives. This report does document concerns requiring the U.S. Army Corps of Engineers Gulf Region South Babil Resident Office follow-up and possible remedial action. Overall, the project has resulted in the construction of new buildings and facilities required in the Statement of



Work. The completed project will result in additional facilities for the Iraqi Army soldiers to live and work.

## **Recommendations and Management Comments**

This report does not contain any negative findings or recommendations for corrective action. Although management comments were not required, the Commanding General, Gulf Region Division of the U.S. Army Corps of Engineers, provided comments concurring with the draft report.

## **Appendix A. Scope and Methodology**

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We performed this project assessment from August through December 2006 in accordance with the Quality Standards for Inspections issued by the President's Council on Integrity and Efficiency. The assessment team included a professional engineer/inspector and an auditor/inspector.

In performing this Project Assessment we:

- Reviewed contract documentation to include the following: Task Order, Task Order Modifications, Contract documentation, and scope of work;
- Reviewed the design package (drawings and specifications), Quality Control Plan, Contractor's Quality Control Reports, U.S. Army Corps of Engineers Quality Assurance Reports, Construction Progress Photos, Punch Lists, and Turnover Letters;
- Interviewed the U.S. Army Corps of Engineers Resident Engineer and Project Engineer, and the Multinational Security Transition Command J-7 (Engineering Directorate) staff; and
- Conducted an on-site assessment and documented results at the 402<sup>nd</sup> Battalion Iraqi Army Headquarters Barracks in Al Hillah, Iraq.

## Appendix B. Acronyms

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|                |   |
|----------------|---|
| BOQ            | Bill of Quantities  |
| cm             | Centimeter  |
| CSI            | Construction Specifications Institute                       |
| GRS            | Gulf Region South   |
| HVAC           | Heating, Ventilation and Air Conditioning                   |
| ID/IQ          | Indefinite Delivery/Indefinite Quantity                     |
| IRRF           | Iraq Relief and Reconstruction Fund                         |
| m              | Meter   |
| mm             | Millimeter  |
| m <sup>3</sup> | cubic meter   |
| MNSTC-I        | Multinational Security Transition Command – Iraq            |
| O&M            | Operation and Maintenance                                   |
| PCO            | Project and Contracting Office                              |
| PE             | Project Engineer  |
| QA             | Quality Assurance   |
| QAR            | Quality Assurance Representative                            |
| QC             | Quality Control   |
| RE             | Resident Engineer   |
| SOW            | Statement of Work   |
| TO             | Task Order  |
| USACE          | U. S. Army Corps of Engineers                               |
| 1/2/8          | First Battalion, Second Brigade, Eighth Division Iraqi Army |

## **Appendix C. Report Distribution**

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### **Department of State**

Secretary of State

Senior Advisor to the Secretary and Coordinator for Iraq

U.S. Ambassador to Iraq

Director, Iraq Reconstruction Management Office

Inspector General, Department of State

### **Department of Defense**

Secretary of Defense

Deputy Secretary of Defense

Director, Defense Reconstruction Support Office

Under Secretary of Defense (Comptroller)/Chief Financial Officer

Deputy Chief Financial Officer

Deputy Comptroller (Program/Budget)

Inspector General, Department of Defense

### **Department of the Army**

Assistant Secretary of the Army for Acquisition, Logistics, and Technology

Principal Deputy to the Assistant Secretary of the Army for Acquisition,

Logistics, and Technology

Deputy Assistant Secretary of the Army (Policy and Procurement)

Assistant Secretary of the Army for Financial Management and Comptroller

Chief of Engineers and Commander, U.S. Army Corps of Engineers

Commanding General, Gulf Region Division

Auditor General of the Army

### **U.S. Central Command**

Commanding General, Multi-National Force - Iraq

Commanding General, Joint Contracting Command – Iraq/Afghanistan

Commanding General, Multi-National Corps – Iraq

Commanding General, Multi-National Security Transition Command – Iraq

Commander, Joint Area Support Group – Central

### **Other Defense Organizations**

Director, Defense Contract Audit Agency

## **Other Federal Government Organizations**

Director, Office of Management and Budget  
Comptroller General of the United States  
Inspector General, Department of the Treasury  
Inspector General, Department of Commerce  
Inspector General, Health and Human Services  
Inspector General, U.S. Agency for International Development  
Mission Director – Iraq, U.S. Agency for International Development

## **Congressional Committees and Subcommittees, Chairman and Ranking Minority Member**

### **U.S. Senate**

Senate Committee on Appropriations  
    Subcommittee on Defense  
    Subcommittee on State, Foreign Operations and Related Programs  
Senate Committee on Armed Services  
Senate Committee on Foreign Relations  
    Subcommittee on International Operations and Terrorism  
    Subcommittee on Near Eastern and South Asian Affairs  
Senate Committee on Homeland Security and Governmental Affairs  
    Subcommittee on Federal Financial Management, Government Information and International Security  
    Subcommittee on Oversight of Government Management, the Federal Workforce, and the District of Columbia

### **U.S. House of Representatives**

House Committee on Appropriations  
    Subcommittee on Defense  
    Subcommittee on Foreign Operations, Export Financing and Related Programs  
    Subcommittee on Science, State, Justice and Commerce and Related Agencies  
House Committee on Armed Services  
House Committee on Government Reform  
    Subcommittee on Management, Finance and Accountability  
    Subcommittee on National Security, Emerging Threats and International Relations  
House Committee on International Relations  
    Subcommittee on Middle East and Central Asia

## **Appendix D. Project Assessment Team Members**

The Office of the Assistant Inspector General for Inspections, Office of the Special Inspector General for Iraq Reconstruction, prepared this report. The principal staff members who contributed to the report were:

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